



Future Trends in Service-Oriented Computing

6th Symposium of the
HPI Research School
June 16 - 17, 2011



Annual Symposium on
Future Trends in Service-Oriented Computing

Contents

Hasso Plattner Institute for IT Systems Engineering	5
Agenda	6
Speakers:	
Prof. Dr. Christoph Meinel	9
Prof. Dr. Andreas Polze	10
Prof. Dr. Hasso Plattner	11
Matthias Uflacker & Cafer Tosun	12
Prof. Dr. Roy Friedmann	13
Prof. Dr. Wolfgang Schröder-Preikschat	14
Prof. Dr. Lars Lundberg	16
Boas Betzler	18
Dr. Gero Decker	19
Dr. Diethelm Schlegel	20
Tobias Vogel	21
Dr. Anne Kayem	22
Prof. Dr. Slim Abdennadher	24
Roman Belter	26
Dieter Hildebrandt	27
Werner Haas	28
Amit Berman	30
Frank Feinbube	32
Gala Yadgar	33
Muthoni Masinde	34
Christopher Chepken	36
Dr. Damien Cassou	38
Research projects presented in the hall	41
The HPI Research School	45
Expansion of the Research School „Service-Oriented Systems Engineering“	50

Hasso Plattner Institute for IT Systems Engineering

The Hasso Plattner Institute for IT Systems Engineering (HPI) at the University of Potsdam is unique in Germany for two key reasons: It was the first university institute in Germany financed entirely by private funds, and second, it is a prime example of a successful public-private partnership. The Hasso Plattner Institute offers the Bachelor's and Master's degree in "IT Systems Engineering" that emphasizes the ability to design, develop, and control large, complex, and distributed IT systems. A particular specialty of the HPI is the strong engineering orientation that intensively incorporates industrial projects in its curriculum.

10 Research Groups shape the profile of the HPI in IT systems engineering. At the HPI, 266 undergraduate and 198 graduate students are currently enrolled and 160 research assistants and Ph.D. students are researching in their respective field. Since October 2005, the HPI runs the Research School on "Service-Oriented Systems Engineering", an international Ph.D. school with 43 students in three different countries: Potsdam in Germany, Cape Town in South Africa, and Haifa in Israel.

The Hasso Plattner Institute tightly cooperates with scientific partners, both nationally and internationally. Among the partners - apart from renowned European universities - are the Stanford University, the Massachusetts Institute of Technology (MIT) in the US, as well as Technical University of Beijing in China. Furthermore, the HPI cooperates with renowned major IT companies, such as EMC, Fujitsu, HP, IBM, Microsoft, SAP, Siemens, T-Mobile, and others.

Agenda

Thursday, June 16, 2011

09:30	Opening of the FutureSOC Symposium Prof. Dr. Christoph Meinel, HPI, Director Prof. Dr. Andreas Polze, HPI, Speaker of Research School
09:45-10:30	Keynote Prof. Dr. Hasso Plattner, SAP <i>In-Memory Technology</i>
10:30-10:45	Coffee Break
10:45-12:15	Session 1 Prof. Dr. Wolfgang Schröder-Preikschat, Friedrich-Alexander-Universität Erlangen-Nürnberg <i>System Software in the Many-Core Era</i> Prof. Dr. Roy Friedmann, Technion, Israel <i>On Power and Throughput Tradeoffs of WiFi and Bluetooth in Smartphones</i> Prof. Dr. Lars Lundberg, Blekinge Institute of Technology, Sweden <i>Real-Time Scheduling for Multiprocessor Service-Based Systems</i>
12:15-13:30	Lunch
13:30-15:30	Session 2 Boas Betzler, IBM <i>Cloud@Work - How we build and operate the IBM public Cloud</i> Dr. Gero Decker, Signavio <i>SaaS vs. On-Premise - a software vendor's technical and business point of view</i> Dr. Diethelm Schlegel, Capgemini <i>Flexible Service Composition - Challenges in BPM Projects</i> Tobias Vogel, HPI Research School <i>Towards self-configuring Data Quality Web Services</i>
15:30-16:00	Coffee Break
16:00-18:00	Session 3 Dr. Anne Kayem, University of Cape Town, South Africa <i>Alone and Sick in the Middle of Nowhere - On the challenges of implementing E-Health in Africa</i> Prof. Dr. Slim Abdennadher, German University in Cairo, Egypt <i>Service-oriented Computing in the context of Education and Research</i>

Roman Belter, Universität Leipzig
Service Management in Electronic Service Systems

Dieter Hildebrandt, HPI Research School
Service-Oriented Visualization of Massive 3D Geovirtual Environments

18:30 **Social Event**

Friday, June 17, 2011

09:00-09:45	Keynote Cafer Tosun / Matthias Uflacker, SAP <i>SAP Innovation Center in Potsdam - An Introduction</i>
09:45-10:00	Coffee Break
10:00-11:30	Session 4 Werner Haas, Intel Labs Braunschweig <i>Shared Memory on SCC - Pitfalls on the Way to Data Consistency</i> Amit Berman, HPI Research School at Technion, Israel <i>Flash Memory Performance: Insights and Multi-Layer Tradeoffs</i> Frank Feinbube, HPI Research School <i>Programming Models for Hybrid Parallel Systems</i> Gala Yadgar, HPI Research School at Technion, Israel <i>MC2: Multilevel Cache Management Based on Application Hints</i>
11:30-11:45	Coffee Break
11:45-12:45	Session 5 Muthoni Masinde, HPI Research School at University of Cape Town <i>A Framework for Integrating Mobile Phones and Wireless Sensors with African Indigenous Knowledge on Drought Prediction</i> Dr. Damien Cassou, HPI <i>Leveraging Software Architectures to Guide and Verify the Development of Sense/Compute/Control Applications</i> Christopher Chepken, HPI Research School at University of Cape Town <i>Organizing Low Skilled Semi-Illiterate Workers Using Mobile Phone and Internet Technologies</i>
12:45	Closing Remarks

Introduction: Hasso Plattner Institute and Future SOC Lab



**Prof. Dr. Christoph
Meinel**

*Hasso Plattner
Institute*

Bio

Christoph Meinel is full professor (C4) for computer sciences at HPI and University of Potsdam, holding a chair on „Internet Technologies and Systems“. His research focuses on Future Internet Technologies, in particular Internet and Information Security, Web 3.0: Semantic, Social and Service Web, as well as innovative Internet Applications, especially in the domains of e-Learning and Telemedicine. Apart from teaching in the HPI Bachelor and Master courses on IT-Systems Engineering he also teaches at the HPI School of Design Thinking. He is a visiting professor at the College for Computer Science at Beijing University of Technology in China and is a senior research fellow at the Interdisciplinary Center for Security, Reliability and Trust (SnT) at the University of Luxembourg (formerly LIASIT - Luxembourg International Advanced Studies in Information Technology). Since 2008, he is program director of the HPI-Stanford Design Thinking Research Program together with Prof. Larry Leifer from Stanford University.



Prof. Dr. Andreas Polze

*Hasso Plattner
Institute
Speaker of the
Research School*

Introduction: Future SOC Symposium

Bio

Prof. Dr. Andreas Polze is the Operating Systems and Middleware Professor at the Hasso Plattner Institute for Software Engineering at University Potsdam, Germany. He is also the head of the Ph.D. school on „Service-Oriented Systems Engineering“ at HPI. Andreas received a doctoral degree from Freie University Berlin, Germany, in 1994 and a habilitation degree from Humboldt University Berlin in 2001, both in Computer Science.

At HPI, his current research focuses on architectures of operating systems, on component-based middleware, as well as on predictable distributed and cloud computing. Andreas Polze was visiting scientist with the Dynamic Systems Unit at Software Engineering Institute, at Carnegie Mellon University, Pittsburgh, USA, where he worked on real-time computing on standard middleware (CORBA) and with the Real-Time Systems Laboratory at University of Illinois, Urbana-Champaign. Andreas has acted as work component leader and member of scientific board in the 6th framework European Integration project “Adaptive Services Grid”. Work in ASG has strong links to the Web Services community and industrial standardization efforts.

His current research interests include Predictable Service Computing, Adaptive System Configuration, and End-to-End Service Availability for standard middleware platforms. He is member of the GI and the IEEE. He currently is member of the program committees of ISORC (Intl. Symp. On Object-Oriented Real-Time Computing) and WORDS (Workshop on Real-Time Dependable Systems). Andreas Polze has (co-) authored more than 60 papers in scientific journals and conference proceedings. He has contributed to five books.

Together with Mark Russinovich and David Solomon, Andreas Polze is one of the co-authors of the Windows Curriculum Resource Kit (CRK), the top-download at the Microsoft faculty resource center. Current projects are centered around the Windows Research Kernel (WRK). Andreas Polze has been funded through the Rotor-I and Rotor -II projects. He received a Phoenix Direct Funding award in 2007 for his research on Phoenix for Real-time Robotics and Process Control.

Keynote: In-Memory Technology

Bio

Prof. Dr. h.c. Hasso Plattner is a co-founder of SAP AG, where he served as the CEO until 2003 and has since been chairman of the supervisory board. SAP AG is today the leading provider of enterprise software solutions. In his role as chief software advisor, he concentrates on defining the mid- and long- term technology strategy and direction of SAP.

Hasso Plattner received his diploma in communications engineering from the University of Karlsruhe. In recent years, he has been focusing on teaching and research in the field of business computing and software engineering at large. In 1998, he founded the Hasso-Plattner-Institute (HPI) in Potsdam, Germany. At the HPI, approximately 450 students are currently pursuing their Bachelors' and Masters' degrees in IT Systems Engineering with the help of roughly 50 professors and lecturers. The HPI currently has about 100 PhD candidates.

Hasso Plattner leads one of the research groups at HPI which focuses mainly on In-Memory Data Management for Enterprise Applications and Human-Centered Software Design and Engineering.



Prof. Dr. Hasso Plattner

*SAP and Hasso
Plattner Institute,
Germany*



Keynote: SAP Innovation Center in Potsdam - An Introduction

Dr. Matthias Uflacker

SAP AG

Bio

As former member of the HPI Research School on Service-oriented Systems Engineering, Matthias received his doctoral degree at the Hasso Plattner Institute in 2011. His research focused on global engineering processes and monitoring practices to analyze success patterns in distributed team collaboration. At the research group Enterprise Platform and Integration Concepts, he was closely involved in the HPI - Stanford Design Thinking Research Program and in projects with Stanford's Center for Design Research.

Matthias is now one of the first team members at the SAP Innovation Center in Potsdam.



Cafer Tosun

SAP AG

Bio

Cafer Tosun, SVP, is head of the new SAP Innovation Center in Potsdam. At the same time he is responsible for joint projects with the Hasso-Plattner-Institut. Cafer joined SAP in 1993 and works since then in different roles in SAP consulting and development. He also worked eight years at SAP Labs in Palo Alto, Silicon Valley.

Cafer studied informatics and is certified project manager of Stanford University.

On Power and Throughput Tradeoffs of WiFi and Bluetooth in Smartphones



**Prof. Dr. Roy
Friedmann**

Technion, Israel

Smartphones are quickly becoming the main computing and (data) communication platform. These days, smartphones are all equipped with Bluetooth and WiFi, which complement their cellular communication capabilities. Bluetooth was originally placed in mobile phones for personal-area communication, such as wireless earphones, synchronization with a nearby PC, and tethering. WiFi was added more recently in order to improve the users' Web surfing experience whenever a WiFi access point is available. Market research predicts that in the very near future WiFi equipped smartphones will outnumber all other WiFi enabled devices combined (laptops, tablets, WiFi enabled TVs, etc.).

Being battery operated, power depletion is a major concern in smartphones design and usage. In particular, it is widely known that wireless communication is a significant source of energy consumption. Hence, having a better understanding of the way wireless communication impacts battery drain and the tradeoff between bandwidth usage and power consumption is important. In this talk, I will describe a combined power and throughput performance study of WiFi and Bluetooth usage in smartphones. The study reveals several interesting phenomena and tradeoffs. The conclusions from this study suggest preferred usage patterns, as well as operative suggestions for researchers and smartphone developers.

Bio

Roy Friedman is an associate professor in the department of Computer Science at the Technion. His research interests include Distributed Systems with emphasis on Mobile Computing, Middleware for Mobile Ad-Hoc Networks, Fault-Tolerance and High Availability. He has published over 90 technical papers on these topics and he holds two patents. Formerly, Roy Friedman was an academic specialist at INRIA (France) and a researcher at Cornell University (USA). He is one of the two technical founders of PolyServe Inc. (acquired by HP) and holds a Ph.D. and a B.Sc. from the Technion.



System Software in the Many-Core Era

Prof. Dr. Wolfgang Schröder-Preikschat

Friedrich-Alexander-Universität Erlangen-Nürnberg

With multi- or many-core processors having gained a foothold in the computer landscape, topics on programming parallel systems renewed which, for many years, were rather unnoticed but currently become more importance again. An example give programming systems, here especially with old/new challenges in (semi-) automatic parallelization and coordination. Another example give operating systems. It can be spoken of a revival because not few problems in programming and operation of many-core processors where already picked out as a central theme in the course of the development of contemporary shared-memory multiprocessor systems in distant past.

Today, multi-core processors are the building blocks (not only) of parallel systems, whereby performance is still given top priority to applications. The performance aspect, however, runs the risk of suffering a loss because of contention when concurrent processes attempt to access shared resources. Contention can be mitigated by means of non-blocking synchronization, but only at the expense of tricky programming. As a (seemingly) less exhausting approach to the protection of critical sections, transactional memory is often invoked in recent time. However, this concept has to be considered differently by referring to application-level software, system-level software, and hardware support. The general problem here is the finding and description of correct and efficient transactions, which gives especially system software an arduous run for his money and occasionally also fails. It turns out that transactional memory, in particular in case of missing hardware support, at best seems to be suited for application-level software only.

The talk discusses challenges in the development and reengineering of system software for multi- or many-core processors. Thereby, we will touch on approaches for the prevention, avoidance, and weakening of contention.

Bio

Dr. Wolfgang Schröder-Preikschat studied computer science at the Technical University of Berlin, Germany, where he also received his Ph.D. and *venia legendi*. After spending about ten years as a research associate and director of the system software department at the German National Research Center of Computer Science (GMD), Research Institute for Computer Architecture and Software Technique (FIRST), Berlin, Dr. Schröder-Preikschat became a full professor for computer science (computer networks and operating systems) at the University of Potsdam, Germany, in 1995. From 1997 to 2002 he was a full professor for computer science (operating systems and distributed systems) at the University of Magdeburg, Germany. Since 2002 he holds the professorship on distributed systems and operating systems at the University of Erlangen-Nuremberg, Germany. The main research interests of Dr. Schröder-Preikschat are in the domain of real-time embedded distributed/parallel operating systems. Dr. Schröder-Preikschat is member of ACM, EuroSys, GI, IEEE, and USENIX.



Real-Time Scheduling for Multiprocessor Service-Based Systems

Prof. Dr. Lars Lundberg

Blekinge Institute of Technology, Sweden

Cloud computing and software-as-a-service, make it possible to offer real-time services, such as on-line trading, on-line gaming and different database lookup services anywhere in the world, as long as there is Internet access. A strong system trend, besides cloud computing, is multi-core processors. This means that these real-time services will be delivered through the cloud by a set of multi-core servers. One would, therefore, like to schedule these real-time services to these multiprocessors in a way that guarantees the time requirements for each service request, and at the same time can accept a maximum number of requests given the available infrastructure.

We will in this presentation look at existing multiprocessor real-time scheduling theory and high-light some important new challenges compared to traditional uni-processors real-time scheduling. Having done that, we will discuss how this theory can be used when designing cloud-based real-time systems. We will also discuss different combinations of multiprocessors, e.g. a small number of big multiprocessors versus a large number of small multiprocessors, as well as different kinds of real-time services, e.g. aperiodic (one-shot) tasks and traditional periodic real-time tasks. When designing cloud-based real-time systems one must also design fast admission tests, i.e. test that can decide if a service request can be accepted so that it can be guaranteed that it will meet its deadline and will not jeopardize the deadlines of already accepted requests. We will show how such fast admission tests can be integrated with the real-time scheduler.

Bio

Lars Lundberg is since more than 10 years a full professor of computer systems engineering at Blekinge Institute of Technology (BTH) in Sweden. Lars took has a master in computer science from Linköping university (Sweden), and a Ph.D. from Lund University (Sweden). Professor Lundberg has had a number of tasks at BTH, including being the dean of the technical faculty for six years, and heading a department with more than 100 people for five years. He is currently the research coordinator at the school of computing, and heading a research group called Communication and Computer Systems Research Laboratory (www.bth.se/com/ccs). His has published more than 100 papers in international journals and conferences. His research interests include real-time systems, high-performance processing, software engineering and recently also cloud computing.



Cloud@Work - How we build and operate the IBM public Cloud

Boas Betzler

IBM

Cloud technologies hold the promise to enable speed and dexterity for faster delivery of new offerings and services. Fundamentals of this promise are standardized infrastructure, dynamic provisioning and self-service through automation. All great buzzwords when put on presentation charts and marketing material. In this session, reality will set in as Boas Betzler relates IBM's effort to build and operate a large scale Cloud offering distributed across seven data centers spanning the world.

Bio

Boas Betzler is a Senior Technical Staff Member and Member of the IBM Academy of Technology and a Global Services Master Inventor. He has worldwide responsibility for the IBM Image Center of both the public SmartCloud Enterprise and the private SmartCloud Enterprise+.

In previous positions, Boas was member of the Systems and Technology Group Software Architecture Board as lead designer for Web Services based Systems Management. Before he was working for the Linux Technology Center and starting the embedded Linux initiative in IBM.

Known as an innovator, he holds several patents in Cloud Computing, System Architecture and Digital Entertainment. Boas is widely know as the Grandfather of Linux on zSeries. Mid 1998 he started the port of Linux to zSeries in the IBM Development Lab in Boeblingen. His most significant accomplishment was to stand in front of many different groups and individuals and fight for his ideas of bringing Linux on S/390 to the market.

He joined IBM in 1995 and worked on systems architecture since then.

SaaS vs. On-Premise - a software vendor's technical and business point of view



Dr. Gero Decker

Signavio

In contrast to the classical software provisioning/licensing model, Software as a Service (SaaS) creates new challenges and opportunities for software vendors, system integrators and customers. This presentation highlights some of the technical and business challenges from the perspective of the software vendor Signavio. Among the technical issues discussed will be multitenancy, customizability, integratability and authentication. Business aspects are the impact on the vendor's business model, sales cycles and partnerships with system integrators.

Bio

Gero Decker is co-founder and managing director of Signavio, a Berlin-based software vendor. Before that he received a PhD degree from Hasso-Plattner-Institute for his thesis „Design and Analysis of Process Choreographies“. Gero Decker also holds a BSc and MSc degree in Software Engineering from Hasso-Plattner-Institute.



Flexible Service Composition - Challenges in BPM Projects

Dr. Diethelm Schlegel

Capgemini

Executable process models allow the flexible composition of business applications by integrating human centric tasks and service functions. Based on a service oriented architecture (SOA), several business process management suites (BPMS) promise seamless integration, high adaptiveness, and short-term results.

Nevertheless, some crucial success factors of software engineering remain important in this context. Examples are the alignment of business and technical aspects, proper documentation, as well as quality assurance. Following the RUP methodology, we will give an overview of method chunks that are important for successful BPM projects. Thereby, differences and challenges compared to custom software development projects are pointed out. It will be shown where appropriate solutions are already available and where some research efforts must take place.

Finally, we will discuss one of the method topics in more detail by presenting general guidelines and explaining their benefit for BPM projects.

Bio

Diethelm Schlegel studied Computer Science at the University of Saarland in Saarbrücken, where he was awarded a PhD in 2000 for his dissertation on high speed data transmission. His professional career mainly focuses on IT support of business processes and the development of methods and tools for the management of complex projects. He is part of the CSD Research team of Capgemini in Offenbach. In his current project „Flexible Service composition“, he deals with the subject of service oriented architecture (SOA) as well as business process management (BPM).

Towards self-configuring Data Quality Web Services



Tobias Vogel

HPI Research School

Data quality is a key factor for economical success. Data quality is usually defined as a set of properties of data, such as completeness, accessibility, relevance, and conciseness, which includes the absence of multiple representations for same real world objects. To avoid such duplicates, there is a wide range of commercial products and customized self-coded software. Maintaining and purchasing these programs is expensive while at the same time it is difficult to set up and tune all necessary parameters in these programs.

Recently, web-based applications for duplicate detection have emerged. However, they are not easy to integrate into the local IT landscape and require much manual configuration effort. DAQS (Data Quality as a Service) is a novel approach to support duplicate detection. The goal is to offer a service that requires minimal user interaction and self-configuration for the provided input data. Each data cleansing task is classified to find out which metadata is available. Next, similarity measures are assigned to the provided records' attributes and a duplicate detection process is carried out.

Bio

Tobias achieved his Bachelor and Master degree in IT Software Engineering at HPI in Potsdam. He is member of the research school on „Service-Oriented Systems Engineering“ since 2009 where he works in the Information Systems group with Prof. Felix Naumann. Main research interests are data quality, web services and machine learning.



Alone and Sick in the Middle of Nowhere - On the challenges of implementing E-Health in Africa

Dr. Anne Kayem

University of Cape Town, South Africa

Mobile E-health is a promising architectural concept for cost effective health care management and distribution in Africa. In Africa, very often access to E-health records on centralised servers is impaired by factors that include power outages and bandwidth limitations. Therefore, implementing conventional E-Health care systems is challenging. An example arises in the case of emergency medicine, where a patient may arrive at a hospital in such a poor state that he/she is unable to give the doctor any information to prevent a misdiagnosis or prescription. In this case, having patients with mobile access to health records can be a live saver.

We are interested in building a mobile architecture in which users will be allowed to keep health records on mobile devices that can be accessed, either by themselves or a health care provider, on demand. One can imagine that this is a sort of distributed system where mobile devices holding e-health records form a service oriented architecture. Users can have their records either stored on their mobile devices or on distributed servers that can be queried via the mobile device. The general idea is to give users more control over their health records and allow health care providers to have a current record of a patient's medical history anytime and anywhere.

From the privacy and security perspective, there are, however a number problems that need to be addressed in order to implement mobile E-health in Africa. First, how do we ensure that the health records are kept safe from unauthorized access; second how do we deal with cases of lost health records without releasing information to malicious users or creating dummy copies of the data; and third how do we prevent inference or unauthorized information sharing. We will focus on these problems and some potential solutions during this talk.

Bio

Anne V.D.M. Kayem is a Senior Lecturer at the University of Cape Town, South Africa. Prior to joining the University of Cape Town in 2010, she was a post-doctoral scholar at the German Research Centre for Artificial Intelligence (DFKI Bremen, Germany). She holds a BSc and MSc in Computer Science from the University of Yaoundé I, Cameroon, and a PhD degree in Computer Science from Queen's University (Kingston, Canada). More recently, she co-authored a monograph entitled "Adaptive Cryptographic Access Control" with Prof. Selim G. Akl and Prof. Patrick Martin. Her research interests lie in the area of information security with a focus on access control, adaptive security, information flow control, and privacy.



**Prof. Dr. Slim
Abdennadher**

*German University in
Cairo, Egypt*

Service-oriented computing in the context of Education and Research

Service oriented computing is a current trend in computing. A small but growing project at the GUC aims to explore the usefulness of this paradigm in the context of educational institutes. Like any university, several computer labs and staff personal computers are run and maintained. The current paradigm of simply network-connected PCs is very inconvenient for several reasons. First, the maintenance of authentication information, user preferences and files is messy and inelegant. Second, the management of software installation specific to certain labs is very difficult. Third, the current arrangement does not allow research staff members to run overnight computations. These reasons are enough to consider other paradigms, but they are far from being the most important. The biggest problem is that resource expansion and pooling are not possible (at least directly). Certain labs or computations may desperately need more resources, while other machines in unused labs sit idle. Service-orientation is a direct and elegant solution to the problem. As a convenient bi-product, employing such a system, gives other benefits including student and staff exposure to this growing paradigm. Several other aspects including reduced power consumption and easy administration also follow directly.

Bio

Prof. Dr. Slim Abdennadher was born in Sfax, Tunisia. He completed his diploma in Computer Science at the university of Kaiserslautern. By the year 2001, Prof. Abdennadher was habilitated in the field of Computer Science from the Ludwig Maximilians-University in Munich.

Prof. Abdennadher is currently the vice president for academic affairs at the German University in Cairo, Egypt and was formerly the dean of the Faculty of Media Engineering & Technology and the study dean for the faculties of engineering.

Prof. Abdennadher published two books in cooperation with Prof. Dr. Thom Fruehwirth on constraint programming which made constraint reasoning and constraint handling rules ones among his favorite research interests. Adding to these, Prof. Abdennadher also specializes in program analysis, semantic web, knowledge representation and recently interested in cloud computing.



Roman Belter

Universität Leipzig

Service Management in Electronic Service Systems

With an increasing demand for higher value services, comprehensive support for service customization, provisioning and management is needed. This presentation details ongoing research work regarding a service management approach, which supports the handling of service resources during the service lifecycle. The approach presents an information model for the management of electronic service resources, a view concept to provide individual views to participating stakeholders as well as a case study regarding the validation of the presented concepts. The outlined approach tackles non-functional management issues which lead to better maintainable, adaptable and extendable service systems.

Bio

Roman Belter is a senior research fellow at the Information Systems Institute of the University of Leipzig, Germany. He has studied at the University of Leipzig and received a Diploma degree in Management Information Systems in 2006. His PhD thesis was supervised by Bogdan Franczyk from the University of Leipzig and Leszek Maciaszek from Macquarie University (Sydney, AUD) and is focused on novel approaches on service management in service computing infrastructures.

During 2008, Roman Belter was manager of the project "Innovation Lab for Moving Ambient Services" (IMAS) which was focused on building diverse services for mobile platform users.

In 2005 Roman Belter attended the national Microsoft Imagine Cup with an innovative mobile application project. The project was awarded as the best project of the German Imagine Cup and achieves the fourth place worldwide.

Roman Belter is co-founder of Smartrunner GmbH which is the company behind Germany's largest Geotracking community smartrunner.com and APPSfactory.de one of Germany's top mobile app development agencies.

Service-Oriented Visualization of Massive 3D Geovirtual Environments

We present an approach and system for service-oriented, standards-based and image-based 3D geovisualization that has the potential to provide interactive visualization of complex, massive 3D geovirtual environments (3DGeoVE) on lightweight devices. Our approach allows a human user to explore, interact with, and define the visual appearance of a remote 3DGeoVE through the Internet and by using lightweight clients such as web-based clients and smartphones. In the proposed system, interactive geovisualization clients retrieve sets of 2D images of projective views of 3DGeoVEs generated by a 3D rendering service. As the key advantage of the image-based approach, the complexity that a client is exposed to for displaying a visual representation is reduced to a constant factor primarily depending on the image resolution. To provide users with a high degree of interactivity, we propose exploiting multiple layers of information encoded into the images for the local reconstruction of visual representations of the remote 3DGeoVE on the client-side. The use of SOA and standards facilitates designing distributed 3D geovisualization systems that are open, interoperable and can easily be adapted to changing requirements. We demonstrate the validity of our approach by presenting proof-of-concept implementations of a 3D rendering service and several image-based 3D clients for the case of virtual 3D city models.

Bio

Dieter Hildebrandt is a research assistant at the Computer Graphics Systems department of the Hasso-Plattner-Institut, Potsdam, Germany, and he is currently pursuing a Ph.D. in Computer Science. He received his Diploma degree in Computer Science from the University of Oldenburg, Germany. For more than five years, he was company shareholder and head of the Software Engineering Department of Piranha Bytes GmbH, Germany. For one and a half year, he was a research assistant at the Business Information Management Division of the OFFIS Institute for Information Technology, Germany. His research interests include service-oriented architectures and 3D geovisualization. He is a member of the GI.



Dieter Hildebrandt

HPI Research School



Shared Memory on SCC - pitfalls on the way to data consistency

Werner Haas

Intel Labs
Braunschweig

The Single-Chip Cloud Computer (SCC) is an experimental processor created by Intel Labs. One area of research is parallel programming with software-managed memory consistency. This talk will look behind the scenes of using cacheable shared memory without a hardware-implemented cache coherency protocol.

While the chip integrates the most IA cores on a single silicon die, it lacks the SMP capability of Intel's regular processors. Thus parallel software has to incorporate principles from the message passing domain as data is not distributed automatically to participating cores. So far, most of the research has looked at the new Message Passing Buffer (MPB) memory type which is frequently combined with SCC's on-die SRAM. In certain cases, however, it is desirable to allow shared access to ordinary memory regions, for example in order to reduce memory copying or to avoid operating system modifications.

We will first present SCC's unique memory architecture and look at a simple producer/consumer application scenario. Starting from a naive implementation we will reflect upon how the actual cache design has to be taken into account for correct operation. This also comprises the interaction between user- and kernel-level software.

Our goal is to provide a glimpse at current activities in Intel's Many-core Applications Research Community (MARC) which shall lay the foundation for scaling software to highly parallel hardware.

Bio

Since 2006, Werner Haas is working on digital design and system architecture at Intel Labs Braunschweig with current focus on the memory subsystem. He is also actively involved in Intel's Many-core Applications Research Community (MARC) where he contributed several Linux drivers for the Single-chip Cloud Computer (SCC).

Before transitioning to Intel Labs he worked two years in Intel's optical networking division on post-silicon validation of its framer products. He was a scientific assistant at the Institute for Computer Aided Design of the University of Erlangen-Nuremberg from 1997-2003, closely collaborating with Lucent/Bell Labs on the design and verification of integrated circuits for optical networking with research focus on the formal specification of event-driven systems. He received the Dipl.-Ing. degree in electrical engineering from the University of Erlangen-Nuremberg in 1997.

His interests include architectures, methods and tools for developing scalable x86 platforms, hardware support for highly parallel software, and system-level design.



Flash Memory Performance: Insights and Multi-Layer Tradeoffs

Amit Berman

*HPI Research School
at Technion*

Flash memory is a form of non-volatile memory (NVM) that can be electrically programmed (written) and erased. When compared with traditional magnetic hard disk drive (HDD), NAND Flash features lower latency read and write operations, lower power consumption, higher throughput, and solid-state reliability. However, NAND Flash still has a worse price-capacity ratio, as well as limited endurance (the number of times that a memory cell can be programmed and erased, typically 10^3 - 10^5 cycles) and retention (the ability of a memory cell to store valid value over time, typically 10 years). Therefore, increasing Flash memory capacity, endurance and retention is highly desirable.

In NAND Flash memory featuring multi-level cells (MLC), the width of threshold voltage distributions about their nominal values affects the permissible number of levels and thus storage capacity. The sensed threshold voltage of a cell is affected by the charge in neighboring cells to a degree that depends on the degree of floating-gate (FG) inter-cell coupling. This results in an apparent broadening of the voltage threshold distributions.

We present a novel approach, whereby the data written to Flash is constrained, e.g., by forbidding certain adjacent-cell level combinations, so as to limit the maximum voltage shift and thus narrow the distributions. We present a new family of constrained codes. Our technique can serve for capacity enhancement or for improving endurance, retention and bit error rate. It may also be combined with various programming order techniques that mitigate the inter-cell coupling effects and with decoding techniques that compensate for them.

Bio

Amit Berman is a Ph.D candidate at the Department of Electrical Engineering, Technion-Israel Institute of Technology. He received B.Sc and M.Sc in Electrical Engineering at 2006 and 2010 respectively. He is a recipient of several awards, including Intel research award and Zalaf award. He held engineering and management positions at Intel, Saifun (acquired by Spansion) and NVMC during 2003-2009. He authored several international publications in the field of non-volatile memory and computer architecture and holds several pending US patents.



Frank Feinbube

HPI Research School

Programming Models for Hybrid Parallel Systems

Hybrid systems built of general purpose processors and special purpose accelerators are a promising way to deal with massive multi-core. Even today they help to speed-up a variety of applications from several domains. Programming these devices, though, still requires a deep understanding of the underlying hardware.

We present a proof-of-concept implementation of a general purpose library for the .NET Framework that abstracts from the hardware characteristics and allows developers to program OpenCL-enabled accelerators using their favorite high-level-language.

Bio

Frank Feinbube is PhD. candidate at the Hasso Plattner Institute at the University of Potsdam. He works with the Operating Systems and Middleware group headed by Prof. Dr. Andreas Polze and is a member of the HPI Research School on „Service-Oriented Systems Engineering“ since 2004.

Frank's research focus is on parallel programming models. He studies approaches to handle the complexity of hybrid parallel architectures w.r.t. coding experience and resulting application performance.

MC2: Multilevel Cache Management Based on Application Hints

Multilevel caching, common in many storage configurations, introduces new challenges to traditional cache management: data must be kept in the appropriate cache and replication avoided across the various cache levels. Additional challenges are introduced when the lower levels of the hierarchy are shared by multiple clients. Sharing can have both positive and negative effects. While data fetched by one client can be used by another client without incurring additional delays, clients competing for cache buffers can evict each other's blocks and interfere with exclusive caching schemes.

We present a global noncentralized, dynamic and informed management policy for multiple levels of cache, accessed by multiple clients. Our algorithm, MC2, combines local, per client management with a global, system-wide scheme, to emphasize the positive effects of sharing and reduce the negative ones.

Bio

I am a Ph.D. student in the Department of Computer Science at the Technion, Israel, and the Hasso Plattner Center for Scalable Computing at the Technion. My advisors are Prof. Assaf Schuster and Dr. Michael Factor. I work on the management of storage caches, focusing on complex hierarchies with multiple levels and multiple clients, and enhanced storage interfaces. I transferred from the M.Sc. program to the Direct Ph.D program in 2006. In 2003, I received my B.Sc. in Computer Science (Cum Laude) in the Dept. of Computer Science at the Technion, Israel.



Gala Yadgar

HPI Research School at Technion



A Framework for Integrating Mobile Phones and Wireless Sensors with African Indigenous Knowledge on Drought Prediction

Muthoni Masinde

*HPI Research School
at University of Cape
Town*

Unlike in other parts of the world, droughts are the leading natural disasters in Africa; they account for over 90% of effects perpetuated by natural disasters. The problem is compounded by the fact that droughts form a complex web of effects for which the onset, termination and quantification/qualification perplexes researchers to date. The agriculture sector still forms the backbone of most economies in Africa with 70% of output being derived from small-scale farmers. This sector happens to be the first casualty of droughts and hence the rampant food insecurity problem in most African countries. Though it may be argued that the science of predicting droughts has come of age especially in the west, the results of such predictions are still alien to African farmers most of whom live in the rural areas where they are still struggling with illiteracy and poor communication infrastructure. However, these farmers are host to indigenous knowledge on not only how to predict droughts but also unique coping strategies. On the other hand, effects of global phenomena such as population growth, climate change, global warming and ICT revolution cannot be ignored and relying only on indigenous knowledge would endanger any community. Embracing ICTs will not only enhance some of the aspects of indigenous knowledge but it will further promote knowledge conservation and promote its transfer from generation to generation. One way of achieving this is by use of Wireless Sensor Networks (WSNs) for measuring environmental parameters and mobile phones for information dissemination. A framework for integrating these two (mobile phones and wireless sensors) technologies with the indigenous knowledge is the focus of this research.

Bio

Ms. Masinde is a PhD student at the Department of Computer Science, University of Cape Town (UCT), South Africa. She is a member of the HPI Research School in ICT4D at UCT and also a member of the Intelligent Systems and Advanced Telecommunication (ISAT) Laboratory. Her research objective is to come up with a drought and climate change monitoring/warning solution that is based on Wireless Sensor Networks (WSNs) and Mobile Phones and how these two technologies can complement African indigenous knowledge on the droughts. Ms. Masinde holds an MSc. in Computer Science from the Vrije Universiteit Brussel, Belgium and a BSc. in Computer Science from the University of Nairobi, Kenya. She is an employee of the University of Nairobi where she has worked for over 13 years; first as software Systems Analyst/Programmer/Team Leader and now as lecturer.



Christopher Chepken

*HPI Research School
at University of Cape
Town*

Organizing Low Skilled Semi-Illiterate Workers Using Mobile Phone and Internet Technologies

The objective of this study is to design and test suitable mobile and internet based applications that can support the informal sector, a case of the day labour market. Day labour market is described as unorganized informal employment arrangement. Just like the formal employment arrangement, day labour market has three major stakeholders namely the employers, workers and intermediary organizations. The corporation and operations among the stakeholders has been found to be ineffective, inaccurate and inefficient. For instance workers travel long distance everyday to look for jobs, as employers drive or commute for equally the same distance to pick up workers at the worker collection points. Intermediary organizations on the other hand spend money and time making phone calls to both employers and workers in an attempt to match the two.

Our challenge is to design Information and Communication technology (ICT) systems that will facilitate an effective and efficient cooperation among the three stakeholders of the day labour market.

We are looking into the following issues: what are the ideal software development methods and strategies that can be applied to such environments as day labor industry? What systems usability issues will need to be considered when developing software for such users? What is the role of mobile phones technology, as an alternative to traditional computing devices, particularly in solving day labor job searching and worker search problems? What are the possible computing architecture required for such set ups? What are the social issues that may not be technologically solved?

Action Research is our study method. We are in our first round of Action Research cycle having implemented a web and a mobile based client application. We have tested the mobile based client application with day labour workers and an intermediary organization in Cape Town South Africa. Our case study areas are Nairobi Kenya, Cape Town South Africa and Windhoek Namibia.

Bio

Christopher is a lecturer at the School of Computing and Informatics, University of Nairobi, Kenya, where he will return after his PhD studies at the HPI Research School based at the University of Cape Town. He holds a BSc (honours) and an MSc in Computer Science from the University of Nairobi. His Research interests include Social Informatics and Telecommuting.



Leveraging Software Architectures to Guide and Verify the Development of Sense/Compute/Control Applications

Dr. Damien Cassou

HPI Research School

A software architecture describes the structure of a computing system by specifying software components and their interactions. Mapping a software architecture to an implementation is a well known challenge. A key element of this mapping is the architecture's description of the data and control-flow interactions between components. The characterization of these interactions can be rather abstract or very concrete, providing more or less implementation guidance, programming support, and static verification.

In this presentation, we explore one point in the design space between abstract and concrete component interaction specifications. We introduce a notion of interaction contract that expresses allowed interactions between components, describing both data and control-flow constraints. This declaration is part of the architecture description, allows generation of extensive programming support, and enables various verifications. We instantiate our approach in an architecture description language for Sense/Compute/Control applications, and describe associated compilation and verification strategies.

Bio

Damien Cassou is a postdoc working in the HPI's Software Architecture research group, lead by Prof. Dr. Robert Hirschfeld. Before that, he was a Ph.D. student in France, supervised by Charles Consel. His thesis was about bringing general-purpose programming tools to dedicated domains. To do that he designed a domain-specific architecture description language whose compiler produces dedicated programming frameworks in a general-purpose programming language.

Damien is also an active member of the Smalltalk community.

Research projects presented in the hall

Reliable Cloud Computing

Operating Systems and Middleware Research Group

How can we make cloud computing more reliable?

Computer architectures are currently undergoing radical changes. Multi-core computers with up to 128 logical cores and giant memories of up to two terabytes are appearing on the market. Fully exploiting their potential for high-performance computing requires new programming models and large-scale parallel data processing. But for cloud computing in particular, higher performance cannot come at the expense of reduced reliability. In the Future SOC Lab, a top-flight research lab inaugurated in June 2010, HPI is investigating new error prediction and prevention processes that can help to avoid disturbances in operation. The researchers from Prof. Andreas Polze's Operating Systems and Middleware group at HPI will be presenting their initial findings at CeBIT. Leading researchers from abroad are also investigating high-performance computing processes at the HPI lab. They include representatives of the University of California, Berkeley and the Blekinge Institute of Technology in Sweden.

In Memory Data Management

Enterprise Platforms and Integration Concepts Research Group

New data management technologies promise to dramatically speed up business software. Scientists from HPI's Enterprise Platform and Integration Concepts research group will present these technologies in detail for the first time at CeBIT. They will demonstrate how analytical and transactional data that are traditionally stored separately can be united in a single database that resides in the vast central memory of a high-performance computer. This in-memory database technology will fundamentally revolutionize business processes, as it will simplify the decision-making process for top-level managers by making quick and flexible analyses available in „real real time“ - and by using cloud computing and powerful mobile devices like the iPad. For example, it can reduce the time needed to analyze 280 million jobs in a dunning run from 20 minutes to just one second. The new technology is possible thanks to ultra-modern computer architectures with up to 128 logical cores and two terabytes of main memory, as used in the HPI top-flight research lab, the Future SOC Lab. HPI founder Prof. Hasso Plattner and his deputy, Dr. Alexander Zeier, have produced a book called „In-Memory Data Management - An Inflection Point for Enterprise Applications, which provides the first comprehensive description of this new system. The book, published by Springer-Verlag, will be presented at CeBIT.

Software Diagnostics

Computergraphics Systems Research Group

Deep insights into the inner workings of software systems

CeBIT visitors can marvel at the innovative tools devised by HPI computer graphics researchers for automatically analyzing complex software systems and for monitoring software development processes. A new technology for software diagnosis visualizes the development history, program structure and run-time behavior of software in dynamic, interactive software maps. These tools can significantly reduce development costs and risks, since they offer software developers, project managers and product managers an early-warning system that enables them to respond to critical situations faster and thus better manage development projects. The software analysis tools are fully automatic and function independently of the programming language and process model. Prof. Jürgen Döllner and his team of scientists from the HPI Computer Graphics Systems group will use well-known systems to provide vivid insights into the inner workings of software systems.

Semantic Media Explorer

Internet Technologies and Systems Research Group

Automatic video analysis recognizes genres, scenes, faces and text - Changing the way we search

The amount of multimedia content on the World Wide Web is growing rapidly. Efficiently managing and organizing it requires new technologies. One example of such a technology is the semantic multimedia search. Scientists from HPI's Internet Technologies and Systems group (lead by Prof. Christoph Meinel) will use an automated process for semantically analyzing audiovisual content to demonstrate how it is possible to access the ever-growing mass of information more efficiently. Their Semantic Media Explorer combines the latest media analysis processes, such as automatic scene segmentation, intelligent character recognition, and the ability to recognize genres and faces in videos. As a result, it provides optimal access to video content. This new kind of multimedia search offers users enhanced support with semantically enhanced metadata and intuitive user interfaces. The information extracted via the media analysis is correlated using semantic information so that users can identify new links and „rummage around“ in the multimedia content. In developing the Semantic Media Explorer, the HPI researchers are using highly efficient processes to process the huge volumes of data in the Future SOC Lab's new high-performance computers.

SOA Security Lab

Internet Technologies and Systems Research Group

Award-winning learning platform gives first-hand experience of Internet security

Service-oriented architecture (SOA) in IT promises to make business processes more flexible by providing easily adaptable, highly reusable services. Thanks to these services, software systems can be built more quickly and can be more easily adapted to the specific requirements of the user. But the use of these services, which are accessible via Internet platforms and can be loosely linked together, also throws up many security issues that must be solved. At CeBIT, scientists from HPI's Internet Technologies and Systems group will use their SOA Security Lab to show how learning about and working with security in service-oriented architecture is little more than child's play. They will offer experienced and aspiring experts opportunities to try out security mechanisms for Internet services and analyze their effects. The lab gained an HPI team first prize in the IEEE Service Cup 2010, awarded in Miami, Florida.

Instant Lab

Operating Systems and Middleware Research Group

Operating-system experiments in cloud-computing lab - Hasso Plattner Institute creates easy access

How can the experimental research methods used in natural sciences be applied in informatics? For example, for computer operating systems? At CeBIT, researchers from HPI's Operating Systems and Middleware group will offer visitors an insight into the InstantLab cloud-computing lab. Working with software giant Microsoft, the Potsdam team are investigating how these kinds of experiments might be carried out on the Azure platform. Their aim is to provide easy access via modern Internet interfaces to complex experimental setups. This will considerably reduce the configuration and maintenance work usually involved.

The HPI Research School

In October 2005, the HPI started its Research School on “Service-Oriented Systems Engineering”, a graduate school based on the model of the DFG (German Research Foundation) “Graduiertenkolleg”.

The Vision of the Research School

Design and implementation of service-oriented architectures impose numerous research questions from the fields of software engineering, system analysis and modeling, adaptability, and application integration.

Service-Oriented Systems Engineering represents a symbiosis of best practices in object orientation, component-based development, distributed computing, and business process management. It provides integration of business and IT concerns.

Service-Oriented Systems Engineering denotes a current research topic in the field of IT systems engineering with high potential in academic research as well as in industrial application. Supported by an internationally renowned grant, PhD students at our college participate in joint activities such as lectures, seminars, winter schools and workshops.

The Members of the Research School

The Professors of the HPI with their research group are supporting pillars for our PhD school. With its interdisciplinary structure, the research college on Service-Oriented Systems Engineering interconnects the HPI research groups and fosters close and fruitful collaborations.

In context of the research college, the different groups at HPI work on the following topics:

- Human Computer Interaction and Computer Vision as Service (Prof. Dr. Patrick Baudisch)
- Service-Oriented Geovisualization Systems (Prof. Dr. Jürgen Döllner)
- Tools and Methods for Software Engineering in Service-Oriented Systems (Prof. Dr. Robert Hirschfeld)
- Security Engineering of Service-Based IT Systems (Prof. Dr. Christof Meinel)
- Service-Oriented Information Integration (Prof. Dr. Felix Naumann)
- Evolutionary Transition of Enterprise Applications to Service-Oriented (Prof. Dr. h.c. Hasso Plattner)
- Operating System Abstractions for Service-Oriented Computing (Prof. Dr. Andreas Polze)
- Services Specification, Composition, and Enactment (Prof. Dr. Mathias Weske)
- Quantitative Evaluation and Optimization of Service-Oriented Systems (Prof. Dr. Werner Zorn)

On the Website of the Research School, please find latest information about the Ph.D. students, their research interests, joint projects, and events:
http://www.hpi.uni-potsdam.de/research_school

Research School Members



Prof. Dr. Jürgen Döllner
Computer Graphics



Prof. Dr. Holger Giese
System Engineering and Modeling



Prof. Dr. Robert Hirschfeld
Software Architecture



Prof. Dr. Christoph Meinel
Internet Technologies and Systems



Prof. Dr. Felix Naumann
Information Systems



Prof. Dr. h.c. Hasso Plattner
Enterprise Platform and Integration Concepts



Prof. Dr. Andreas Polze
Operating Systems and Middleware
Speaker of the Research School



Prof. Dr. Mathias Weske
Business Process Technology



Prof. Dr. Werner Zorn
Communication Systems



Prof. Dr. Batrick Baudisch
Human Computer Interaction



Dr. Ahmed Awad
Business Process Technology



Dr. Damien Cassou
Software Architecture



Dr. Liwei Chan
Human Computer Interaction



Christian Krause, PhD
System Analysis and Modeling



Ziawasch Abedjan
Information Systems



Mohammed Abujarour
Information Systems



Rehab AlNemr
Internet Technologies and Systems



Malte Appeltauer
Software Architecture



Saurabh Arora
Internet Technologies and Systems



Martin Beck
Computer Graphics Systems



Basil Becker
System Analysis and Modeling



Amit Berman
Technion



Orna Agmon Ben-Yehuda
Technion



Yaniv Ben-Itzhak
Technion



Christopher Chepken
University of Cape Town



Ittay Eyal
Technion



Frank Feinbube
Operating Systems and Middleware



Felix Geller
Software Architecture



Shikoh Gitau
University of Cape Town



Regina Hebig
System Analysis and Modeling



Uwe Hentschel
Operating Systems and Middleware



Dieter Hildebrandt
Computer Graphics Systems



Jan Klimke
Computer Graphics Systems



Shahar Kvatinisky
Technion



Alex Kogan
Technion



Thomas Kowark
Enterprise Platform and Integration Concepts



Johannes Lorey
Information Systems



Muthoni Masinde
University of Cape Town



Andreas Meyer
Business Process Technology



Sebastian Pasewaldt
Computer Graphics Systems



Raymond Mugwanya
University of Cape Town



Emilian Pascalau
Business Process Technology



Michael Perscheid
Software Architecture



Artem Polyvyanyy
Business Process Technology



Jan-Arne Sobania
Operating Systems and Middleware



Richie Ssembatya
University of Cape Town



Ibrahim Takouna
Internet Technologies and Systems



Tobias Vogel
Information Systems



Gala Yadgar
Technion



Eyal Zohar
Technion



Dmitri Perelman
Technion



Alex Shpiner
Technion



Grace Ssekakubo
University of Cape Town



Ivonne Thomas
Internet Technologies and Systems



Thomas Vogel
System Analysis and Modeling



Sebastian Wätzoldt
System Analysis and Modeling



Sebastian Ziller
Enterprise Platform and
Integration Concepts

Former Members



Dr. Alexandre Bergel
Software Architecture



Benjamin Hagedorn
Computer Graphics Systems



Stephan Kluth
Communication Systems



Harald Meyer
Business Process Technology



Alexander Schmidt
Operating Systems and Middleware



Dr. Matthias Uflacker
Enterprise Platform and
Integration Concepts



Flavius Copaciu
Communication Systems



Dr. Markus Jobst
Postdoc
Computer Graphics



Dr. Nikola Milanovic
Operating Systems and Middleware



Michael Menzel
Internet Technologies and Systems



Dr. Michael Schöbel
Operating Systems and Middleware

Expansion of the Research School „Service-Oriented Systems Engineering“

8 Ph.D. grants available - starting October 1, 2011

Hasso-Plattner-Institute (HPI) is a privately financed institute affiliated with the University of Potsdam, Germany. The Institute's founder and benefactor Professor Hasso Plattner, who is also co-founder and chairman of the supervisory board of SAP AG, has created an opportunity for students to experience a unique education in IT systems engineering in a professional research environment with a strong practice orientation.

In 2005, HPI initiated the research school in „Service-Oriented Systems Engineering“ under the scientific supervision of Professors Jürgen Döllner, Holger Giese, Robert Hirschfeld, Christoph Meinel, Felix Naumann, Hasso Plattner, Andreas Polze, Mathias Weske and Patrick Baudisch.

We are expanding our research school and are currently seeking

8 Ph.D. students (monthly stipends 1400-1600 Euro) and
2 Postdocs (monthly stipend 1800 Euro)

Positions will be available starting October 1, 2011. The stipends are not subject to income tax.

The main research areas in the research school at HPI are:

- Self-Adaptive Service-Oriented Systems
- Operating System Support for Service-Oriented Systems
- Architecture and Modeling of Service-Oriented Systems
- Adaptive Process Management
- Services Composition and Workflow Planning
- Security Engineering of Service-Based IT Systems
- Quantitative Analysis und Optimization of Service-Oriented Systems
- Service-Oriented Systems in 3D Computer Graphics
- Service-Oriented Geoinformatics

Prospective candidates are invited to apply with:

- Curriculum vitae and copies of degree certificates/transcripts,
- A short research proposal,
- Writing samples/copies of relevant scientific papers (e.g. thesis, etc.),
- Letters of recommendation.

Please submit your applications by July 31, 2011 to the coordinator of the research school:

Prof. Dr. Andreas Polze
Hasso-Plattner-Institute, Universität Potsdam
Postfach 90 04 60, 14440 Potsdam, Germany

Successful candidates will be notified by September 15, 2011 and are expected to enroll into the program on October 1, 2011.

For additional information: <http://kolleg.hpi.uni-potsdam.de>
or contact the office: Telephone +49-331-5509-220, Telefax +49-331-5509-229
Email: office-polze@hpi.uni-potsdam.de



Hasso-Plattner-Institut
IT-Systems Engineering | Universität Potsdam
Campus Griebnitzsee
Prof.-Dr.-Helmert-Straße 2 - 3
14482 Potsdam

Tel.: (+49 331) 55 09-0 Fax: (+49 331) 55 09-129

www.hpi.uni-potsdam.de hpi-info@hpi.uni-potsdam.de